#13 cont.

is operative to drive either said first and second crankshafts or said third crankshaft. --

REMARKS

Attorney for applicants expresses his appreciation for all of the help the Examiner gave in phone discussions regarding the amending of the specification.

The grounds of rejection are summarized and numbered in the order presented by the Examiner as follows:

1. ABSTRACT

   The Abstract is incomplete;

2. DRAWINGS

   Fig. 3 does not show section lines;

3. JAPANESE PATENT

   A copy of Japanese Patent Laid-Open No. 103,689/1984 is requested;

4. SPECIFICATION

   The specification contains grammatical and idiomatic errors and should be revised;

5. INDEFINITENESS IN SPECIFICATION

   35 U.S.C. 112 (first paragraph), specifically "no means to disengage the clutch in Figs. 5 and 6 is provided"; page 19, lines 1-4, and page 25, lines 15-26;

6. INDEFINITENESS IN CLAIMS

   35 U.S.C. 112 (second paragraph) claims 1-4 are indefinite; and

7. OBVIOUSNESS

   35 U.S.C. 103, obviousness.

The grounds of rejection will now be discussed in the order listed above.

1. ABSTRACT

The Abstract of the specification has been revised to recite the third crankshaft.

2. DRAWINGS

A separate letter is submitted enclosing a copy of Fig. 3 with the crosshatching applicant proposes to add thereto shown in red. In anticipation that the changes will be approved, a copy of this letter is also enclosed for the Official Draftsman along with three copies of a finalized Fig. 3 containing black crosshatching corresponding to that shown in red. Approval of the Examiner is requested for the entry of the substitute sheet of drawings showing Fig. 3 with crosshatching.

3. JAPANESE PATENT

In accord with the Examiner's request, a copy of Japanese Patent Laid-Open No. 103,689/1984 is enclosed.

4. SPECIFICATION

As requested by the Examiner, the specification has been carefully reviewed and amended to correct grammatical and idiomatic errors and to provide antecedant basis for the phrasing of new claim 5. No new matter has been added. To assist the Examiner in reviewing the changes, a work copy of the pages amended is enclosed with the amendments inserted thereon. Applicants stand ready to make any other changes to the specification the Examiner may request.

5. INDEFINITENESS

The Examiner's inquiry regarding the operation of clutch 36 is noted. The description in the original specification is basically correct and this description has been improved by the amendments made to the specification. More specifically, the structure and the operation of clutches 35 and 36 (Figs. 5 and 3)

are as follows:

GEAR CHANGE MECHANISM STRUCTURE

"The clutch gear 34 is nonrotatably fixed to the rotary shaft 33. The first drive gear 39 and the second drive gear 40 at both sides of the clutch gear 34 are rotatably supported on the rotary shaft 33 and are slidable in the axial direction along rotary shaft 33.

The coil spring 43 at one side of said rotary shaft 33 urges the teeth of first drive gear 39 into engagement with the teeth of clutch gear 34 so that claw clutch 35 at one side of said clutch gear 34 meshes with the claw clutch 41 of said first drive gear 39. The teeth of claw clutches 35 and 41 drivingly engage in opposite directions. Thus the clutch gear 34 is interlocked to the first drive gear 39 through the mutual claw clutches 35, 41 when the clutch gear 34 is rotated in the direction of the solid line arrow on gear 34 in Fig. 5 as will be more fully explained hereinbelow when the function is described.

The coil spring 44 at the other side of said rotary shaft 33 urges the teeth of the second drive gear 40 into engagement with the teeth of the clutch gear 34 so that the claw clutch 42 of said second drive gear 40 meshes with the claw clutch 36 at the other side of said clutch gear 34. The teeth of claw clutches 36 and 42 drivingly engage in opposite directions of rotation. Thus the clutch gear 34 is interlocked to only the second drive gear 40 through the mutual claw clutches 36, 42 when the clutch gear 34 is rotated in the direction of the dotted line arrow on gear 34 in Fig. 5 as will be more fully explained hereinbelow when the function is described.

In addition, the first interlinking gear 46, which is in mesh with said first drive gear 39 is nonrotatably fixed on the first crankshaft 45. The second interlinking gear 47, which is in mesh with second drive gear 40 is an idler gear mounted for rotation about the first crankshaft 45.

Further, the first relay gear 51 which is in mesh with said first interlinking gear 46 is nonrotatably fixed on the second crankshaft 50. The second relay gear 52 which is in mesh with the second interlinking gear 47 is an idler gear mounted for rotation about the second crankshaft 50.

GEAR CHANGE MECHANISM FUNCTION

The function of the above described gear train is as follows. When the motor 28 is rotated in a first or forward direction, for example, to rotate the clutch gear 34 in the direction of the solid line arrow thereon in Fig. 5, only the first drive gear 39 is rotated by the clutch gear 34 through the mutually engaged claw clutches 35, 41. The claw clutch 36 of the clutch gear 34 is not drivingly engaged with the claw clutch 42 of the second drive gear 40 because the engaging direction of the teeth of the claw clutch 36

is in the opposite direction. Specifically, the claw clutch 36 is rotated in the direction of the solid line arrow on gear 34 but the teeth of clutch 36 slide over the the teeth on the claw clutch 42 which is permitted because clutch 42 can slide axially along shaft 33 against the coil spring 44. Thus the second drive gear 40 will not rotate in the direction of the solid line arrow on gear 34 in Fig. 5 and the rotation of the clutch gear 34 is not transmitted to the second drive gear 40. Accordingly, the second interlinking gear 47 is not rotated and only the gear 39 is rotated when the motor 28 is rotated in the normal direction.

Upon rotation of the first drive gear 39, the first crankshaft 45 is also rotated through the rotation of the first interlinking gear 46 in the direction of the solid line arrow on gear 46 in Fig. 5. The rotation of the first interlinking gear 46 causes the first relay gear 51 and its associated second crankshaft 50 to rotate.

When the motor 28 is rotated in the opposite direction, the clutch gear 34 is rotated in the direction of the dotted line arrow on gear 34 in Fig. 5, and only the second drive gear 40 is rotated by the clutch gear 34 through the mutually engaged claw clutches 36, 42. The claw clutch 35 of the clutch gear 34 is not engaged with the claw clutch 41 of the first drive gear 39 because the engaging direction of the teeth of claw clutch 35 is in the opposite direction. Specifically, the claw clutch 35 is rotated in the direction of the dotted line arrow in gear 35 but the teeth of clutch 35 slide over the teeth on the claw clutch 41 which is permitted because clutch 41 can slide axially against the coil spring 43. Thus the first drive gear 39 will not rotate in the direction of the dotted line arrow on gear 34 in Fig. 5, so that the rotation of the clutch gear 34 is not transmitted to the first drive gear 39 and the first interlinking gear 46. Therefore, only the second drive gear 40 is rotated when the motor 28 is rotated in the opposite direction.

Upon rotation of the second drive gear 40, the second interlinking gear 47 and the second relay gear 52 are rotated in the direction of the dotted line arrow on gear 47 in Fig. 5. Because gear 47 idles on crankshaft 45, the crankshaft will not rotate.

6. INDEFINITENESS IN CLAIMS

Existing claims 1-4 have been cancelled and new claim 5 substituted in their place. The indefiniteness referred to by the Examiner has been eliminated in new claim 5.

7. OBVIOUSNESS

The problem applicants solved is how to either move only the legs or alternatively only move the arms, mouth and generate

sound of a motion toy.

The invention of the present application resides in the combination of first, second and third crankshafts and a gear changeover mechanism 30-44 (Fig. 5) or 30, 31, 85-95 (Fig. 9) operatively connecting a drive motor 28 to the crankshafts to selectively rotate either one of the crankshafts 65 (to move leg levers 68) or both of the other two of said crankshafts 45, 50 (to move said arms, mouth and generate sound).

The above combination is defined in new claim 5 which recites in part,

" - a first crankshaft rotatably mounted on said toy body ...

- a second crankshaft rotatably mounted on said toy body ...

- a third crankshaft rotatably mounted on said toy body ...

- a gear changeover mechanism mounted on said toy body and operatively connected beween said motor output shaft and said first, second and third crankshafts to either

rotate one of said first, second or third crankshafts but not the other two of said crankshafts, or to

rotate said other two of said crankshafts but not said one crankshaft; ..."

The cited prior art does not disclose or suggest the above recited structure. None of the cited prior patents disclose a motion toy which either walks or moves its arms, mouth and generates sound and none suggest first, second and third crankshafts coupled with a gear change mechanism to achieve the above functions.

Iwaya discloses a gear mechanism having only two crankshafts. The toy does not have both arms and legs that are driven. Basically, the toy of Iwaya walks, moves its mouth and makes a

sound.

Tomaro discloses a gear mechanism that has no crankshafts. The toy does not have both arms and legs that are driven. Basically, the toy of Tomaro moves on eccentrically mounted wheels and makes a sound. Applicants appreciate that the Tomaro toy is sound actuated but sound actuation is not the heart of the novel concept claimed by applicant.

Saigo was cited only for its showing of an arm frame 17 containing a core of bendable wire. This element is no longer recited in applicants claimed combination and thus withdrawal of the citation of Saigo is requested.

Colwell discloses a gear mechanism that has only two crankshafts which only move legs. The toy of Colwell does not have both arms and legs. Basically, the toy of Colwell only walks.

Applicants submit that any combination of the recited references would be improper because none of the references suggest or disclose movable arm frames. Further, none of these references suggest that arm frames should be combined with leg frames and that a gear changeover mechanism utilizing three crankshafts be operatively connected to actuate either the legs or the arms, mouth and sound. Since the combined alternative functions of applicants' toy are not disclosed in the prior art, it is not obvious to use a novel three crankshaft gear changeover mechanism.

In the present invention as claimed, the motion toy appears to respond to an instruction of a player who generates an external sound signal. Moreover, the toy reacts in response to the frequency of the external sound signal generated. Further, in the embodiment of Fig. 9, the three crankshafts permit the

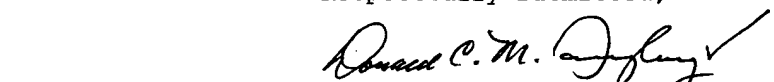
next motion of the toy after it is stopped to become an unexpected or surprising motion to retain the interest of the player. Thus it is possible for the player to instantly or intermittently control the motion of the toy as he desires.

A petition for a one-month extension of time for response is enclosed.

The Commissioner is hereby authorized to charge payment of any additional fees associated with this communication or credit any overpayment to Deposit Account No. 14-1080.

Reconsideration and allowance of this application is requested.

Respectfully submitted,



Donald C. McGaughey
Registration No. 17,980
Telephone (414) 276-0977

Nilles, Custin & Kirby, s.c.
Suite 3070
777 East Wisconsin Avenue
Milwaukee, WI 53202

Dated: December 16, 1987

DCM:ds DCM1

Enclosures

Part of #7

WORK COPY SHOWING AMENDMENTS MADE DECEMBER 16, 1987 in SN 11,885

of hands.

In addition, in accordance of another embodiment of an animal motion toy of the present invention, when the drive mechanism is driven by an external sound signal, the operation of the drive mechanism rotates the first crankshaft and the second crankshaft or the third crankshaft. The rotation of the first and second crankshafts causes the toy body to perform various ~~motion~~ MOTIONS as in the case of the animal motion toy of the aforementioned first invention. However, the rotation of the third crankshaft moves the leg frames alternately back and forth, so that the toy body exhibits a walking motion.

Furthermore, either the respective operations of the both arm frames, the upper jaw frame of the mouth portion, and the sounding member or the operation of the leg frames is selected and set in advance, the toy body exhibits the selected motion, and when it is preset in such a manner that each of the operations is to be carried out in steps, these operations are automatically changed over to exhibit these operations in steps.

Thus, the toy body exhibits the aforementioned various ~~motion~~ MOTIONS by the sound of clapping of hands, for instance. However, at that juncture, if hands are

mechanism thereof;

Fig. 7 is a block diagram of a control unit;

Fig. 8 is a side elevational view illustrating an internal mechanism of an animal motion toy in accordance with another embodiment of the present invention;

Fig. 9 is an exploded perspective view thereof;

Fig. 10 is a front elevational view of a change-over mechanism thereof; and

Fig. 11 is a cross-sectional view taken along a line XI-XI of Fig. 10.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In Figs. 1 to 6, a toy body 1 modeled in the form of, for instance, a monkey comprises a main body frame 2, arm frames 3, 3 on both sides thereof, leg frames 4, 4 on both sides thereof, and a fur coat 5.

The main body frame 2 is formed of synthetic resin and includes a body frame portion 6, a head frame portion 7, and a hip frame portion 8 having in a lower portion thereof a floor-contacting projection 8a. An accommodating recess 9 is formed in the rear of the body frame portion 6, and a microphone 10 is installed in this accommodating recess 9. In addition, a guide port 11 is formed in an upper portion of the head frame portion 7. A face frame portion 12 in

the front portion is provided with eyes 13, 13. An upper jaw frame 15 which opens and closes a mouth portion relative to a lower jaw frame 14 formed integrally with the face frame portion 12 is fixed openably to the face frame portion 12. A headphone 17 is mounted on the head frame portion 7.

Each of the arm frames 3, 3 on both sides has a flexible frame piece 20 in which a core material 19 is embedded in an ~~elongaged~~ ELONGATED planar synthetic resin piece 18. A mounting piece 21 made of synthetic resin is secured integrally with one end of the flexible frame piece 20. A portion of this mounting piece 21 which is adjacent to the other end thereof is inserted and retained in a transversely ~~elongaged~~ ELONGATED groove 22 formed on the respective sides of the jaw portion of the main body frame 2 such as to be vertically movable.

A frame member 23 is secured inside the body frame portion 6 of the main body frame 2. A battery case 24 accommodating a POWER SOURCE SUCH AS battery B is secured in the rear portion of this frame member 23. A cover plate 26 is disposed on the underside of the body frame portion 6 in such a manner that a bottom plate 25 of the frame member 23 and the battery case 24 is openable. A main switch 27 projects from the cover

THE MOTOR 28 HAS A PINION GEAR 29 CONSTITUTING A ROTARY POWER OUTPUT. THE DRIVE MECHANISM A ALSO INCLUDES A GEAR CHANGE OVER MECHANISM 30-44, BEST SHOWN IN FIGS 3, 5 AND 6, WHICH WILL NOW BE DESCRIBED. A

plate 26.

The frame member 23 is provided with a drive mechanism A. This drive mechanism A ~~is arranged such that~~ INCLUDES a forward and reverse changeover motor 28 electrically connected to the battery B, WHICH is secured to the frame member 23 ~~and a reduction gear 31 of~~ a rotary shaft 30 pivotally mounted on the frame member 23 HAS A REDUCTION GEAR 31 NONROTATABLY MOUNTED THEREON THAT meshes with the pinion 29 of the motor 28. ~~A~~ drive gear 32 ~~being~~ IS NONROTATABLY secured to the rotary shaft 30. A rotary shaft 33 is pivotally supported by the frame member 23 such as to be rotatable. A clutch gear 34 meshing with the drive gear 32 is secured to the rotary shaft 33. Claw clutches 35, 36 which engage or ~~disengages the~~ DISENGAGE UPON rotation in the mutually opposite direction are formed at the both side portions of the clutch gear 34. In addition, a first drive gear 39 and a second drive gear 40 are ~~pivotally~~ ROTATABLY supported ~~by~~ ON guide shafts 37, 38 which are rotatable about the rotary shaft 33 extending integrally from the both sides of the clutch gear 34, so that the first and second drive gears 39, 40 are rotatable and axially slidable. A claw clutch 41 disengageably ~~engaging~~ ENGAGABLE with one claw clutch 35 is formed inside the first drive gear 39, while ~~a~~ ANOTHER claw clutch 42 disengageably ~~engaging~~ ENGAGABLE with the other claw clutch 36 is formed inside

the second drive gear 40. Coil springs 43, 44 are respectively wound around the guide shafts 37, 38 and between the frame member 23 and the respective outer walls of the first and second drive gears 39, 40. The first and second drive gears 39, 40 are respectively urged by the coil springs 43, 44 in the direction of the clutch gear 34, and the engagement between the claw clutches 35, 41 and between the claw clutches 36, 42 is effected, respectively.

THE DRIVE MECHANISM A ALSO INCLUDES A ~~A~~ first crankshaft 45 ~~is~~ rotatably ~~pivotally~~ supported by the frame member 23. A first interlinking gear 46 meshing with the first drive gear 39 is secured to the first crankshaft 45, while a second interlinking gear 47 meshing with the second drive gear 40 is rotatably supported by the same FIRST CRANK SHAFT 45. In addition, the lower ends of lifting and lowering levers 49, 49 are respectively fixed to the crankarms 48, 48 of the end portions of the first crankshaft 45 such as to be rotatable. The upper end portions of the lifting and lowering levers 49, 49 are respectively inserted and retained in the inner end portions, i.e., the other ends, of the mounting pieces 21, 21 of the arm frames 3, 3. The rotation of the first crankshaft 45 causes the lifting and lowering levers 49, 49 on both sides to perform the lifting

and lowering motion. At the same time, the arm frames 3, 3 are adapted to be moved vertically ABOUT ~~with~~ the transversly elongated grooves 22, 22 in the main body frame 2.

THE DRIVE MECHANISM A FURTHER INCLUDES In addition, a second crankshaft 50 is pivotally WHICH supported by the frame member 23 SO ~~such~~ as to be rotatable. A first relay gear 51 meshing with the first interlinking gear 46 is secured to the second crankshaft 50, while a second relay gear 52 meshing with the second interlinking gear 47 is pivotally supported by the same such as to be rotatable. A crank arm 53 which is an end portion of the second crankshaft 50 is inserted rotatably in a transversly ELONGATED ~~elongaged~~ insertion hole 55 formed in a lower end portion of the interlinking lever 54. This interlinking lever 54 is disposed vertically movably via a support shaft 57 inserted in a vertically ELONGATED ~~elongaged~~ guide hole 56 formed in the MIDPORTION ~~midway~~ of the interlinking lever 54. A pushing piece 58 is formed in a horizontally bent shape at the upper end portion of this interlinking lever 54. A projecting piece 61 of a bellows 60 of a sounding member 59 is retained in the midway of this pushing piece 58. The sounding member 59 is secured to an upper portion of the frame member 23. A lower end portion of an interlinking

piece 62 is secured to an end portion of the pushing piece 58 of the interlinking lever 54. A lower end portion of an operating piece 64 projecting downwardly from the proximal end of the upper jaw frame 15 via a shaft lever 63 is pivotally secured to an upper end portion of the interlinking piece 62. The interlinking lever 54 is moved vertically by the crankarm 53. The sounding member 59 is pushed by the pushing piece 58 thereof to cause the sounding member 59 to make a sound. The vertical movement of the interlinking piece 62 opens and closes the upper jaw frame 15 with a horizontal shaft 16 as a fulcrum.

THE DRIVE MECHANISM A FURTHER INCLUDES A ~~A~~ third crankshaft 65 ~~is~~ pivotally supported WHICH by the frame member 23 such as to be rotatable. A leg-driving gear 66 meshing with the second relay gear 52 is secured to the third crankshaft 65. Substantially intermediate portions of leg levers 68, 68 are each pivotally supported by crankarms 67, 67, i.e., the end portions thereof, such as to be rotatable. The leg frames 4, 4 are each pivotally secured to the lower end portions of the leg levers 68, 68 on both sides via transversely elongaged insertion holes 69, 69 and support shafts 70, 70. The both end portions of a guide support lever 72 pivotally

supported by the frame member 23 are rotatably inserted in vertically elongaged guide holes 71, 71 formed at upper end portions of the leg levers 68, 68 on both sides.

A rotary switch 73 connected to the motor 28 and used to change over the forward and reverse rotation of the motor 28 is secured inside the head frame portion 7 of the main body frame 2. An operating lever 74 for changing over this rotary switch 73 projects vertically movably from the inside of the guide port 11 formed in the head frame 7, and a pressing portion 75 is formed at an upper end portion of the operating lever 74. A circuit board 76 is secured inside the hip frame portion 8 of the main body frame 2. A control unit 77 connected to the microphone 10, the motor 28, and the rotary switch 73 and adapted to control the motion of the toy body 1 is disposed on the circuit board 76. As shown in Fig. 7, this control unit 77 comprises (THE MICROPHONE 10) a level detection circuit 78 for detecting the level of a sound signal applied to the microphone 10, a switching circuit 79 operative by a certain detection level of the level detection circuit 78, a time constant circuit 80 for holding the operation of the switching circuit 79 for a fixed time, an

THE CIRCUITS 78, 79, 80, 81, 82 CONSTITUTE MEANS RESPONSIVE TO A SOUND SIGNAL FOR CONNECTING THE POWER SOURCE B TO TURN ON MOTOR 28 AND OPERATE THE GEAR CHANGEOVER MECHANISM FOR A PRESELECTED PERIOD OF TIME AND FOR DISCONNECTING THE POWER SOURCE B TO TURN OFF MOTOR 28.

amplifier circuit 81, and a drive circuit 82 for driving the motor 28.

The operation of the above-described arrangement will be described hereafter.

First, the main switch 27 is turned on. Then, if an external sound signal such as specific acoustic sound or vibratory sound is generated by clapping of hands, a musical instrument such as a whistle, or an acoustic instrument, this external sound signal is applied to the microphone 10, and ~~is, at the same time, output~~ AND THE OUTPUT THEREOF IS TRANSMITTED to the level detection circuit 78 as a sound signal. Then, this level detection circuit 78 detects the level of the input sound signal, and when the sound signal is at a predetermined level, the sound signal is applied to the switching circuit 79, thereby turning on the switching circuit 79. The turning on of this switching circuit 79 operates the time constant circuit 80 and holds the on-state of the switching circuit 79 for a fixed time, and, at the same time, amplifies the same by the amplifying circuit 81, and outputs to the drive circuit 82. The operation of the drive circuit 82 drives the motor 28 in the forward direction, for instance, and the driving of the motor 28 is stopped after a lapse of a fixed time.

When the motor 28 is driven, the drive gear 32 is rotated via a pinion 29 and the reduction gear 31, and the clutch gear 34 meshing with the drive gear 32 is rotated in the direction of the arrow of a solid line ON GEAR 34 in Fig. 5. When the clutch gear 34 is rotated, the first drive gear 39 is moved in an interlinking relationship via the claw clutches 35, 41 which are engaged with each other, and is rotated in the direction of the arrow of a solid line in Fig. 5. The clutch 36 of the clutch gear 34 rotates while sliding without engaging with the claw clutch 42 of the second drive gear 40 BY REASON OF THE CLAWS OF CLUTCH 36 ~~and~~ pushing the second drive gear 40 outwardly IN ~~of~~ the axial direction in opposition to the coil spring 44. Accordingly, when the motor 28 is rotated forwardly, the first drive gear 39 is rotated by means of the clutch gear 34 without imparting the rotation to the second drive gear 40.

Then, the rotation of the first drive gear 39 rotates the first crankshaft 45 via the first interlinking gear 46. At the same time, the rotation of the crankarms 48, 48 of both ends thereof that are offset with each other causes the respective lifting and lowering levers 49, 49 substantially simultaneously, with the result that the arm frames 3,

portion 75 of the operating lever 74 of the rotary switch 73 is pushed, which in turn causes the operating lever 74 to be lowered, and, at the same time, the rotary switch 73 is changed over, thereby changing over the motor 28 from the forward rotation to the reverse rotation.

In this state, when an external sound signal, such as the one described above, is applied into the microphone 10, the motor 28 rotates in the reverse direction by means of the aforementioned operations of the control unit 77. The drive of this motor 28 rotates the clutch gear 34 in the direction of the DOTTED LINE ARROW ON GEAR 34 ~~arrow of a chain line~~ in Fig. 5. The second drive gear 40 is moved in an interlinking relationship via the mutually engaging claw clutches 36, 42 and rotates in the direction of the DOTTED LINE ARROW ON GEAR 34 ~~arrow of a chain line~~ in Fig. 5. The claw clutch 35 of this clutch gear 34 rotates while pushing the first drive gear 39 outwardly IN ~~of~~ the axial direction in opposition to the coil spring 43 while sliding PAST BUT without engaging with the claw clutch 41 of the first drive gear 39. Accordingly, when the motor 28 is rotated in the reverse direction, the second drive gear 40 is rotated by means of the clutch gear 43 without imparting the rotation to the first drive gear 39.

the main switch 27 turned on, the motor 28 is changed over to the forward or reverse direction. Therefore, the motor 28 is driven by an external sound signal, and the toy body 1 alternately repeats, in response to external sound signal and for respective fixed times, the motion of singing and dancing while opening and closing the mouth by vertically moving the upper jaw frame 15 while vertically rotating the arm frames 3, 3 as well as the motion of walking.

In the foregoing embodiment, description has been made of a case where the motion of the arm frames 3, 3, the upper jaw frame 15, and the sounding member 59 and the motion of the leg frames 4, 4 are manually changed over by providing the manually operated rotary switch 73. However, an arrangement may be made such as to automatically change over these motions by providing an automatic changeover mechanism. GEAR 30, 31, 85-95 (FIG.S 9, 10 AND 11)

In this case, for instance, an arrangement shown Figs. 8 to 11 may be adopted. ~~In other words, this~~ THIS automatic changeover mechanism is arranged as follows: A rotary shaft 85 is ~~pivotally~~ ROTATABLY supported by the frame member 23. A changeover operation gear 86 meshing with the aforementioned drive gear 32 is secured NONROTATABLY to this rotary shaft 85. A sliding gear 87 meshing with the drive gear 32 is pivotally supported by the rotary

shaft 85 such as to be axially ~~slidbl~~(SLIDABLE)e. A changeover gear 89 formed in a fixed positional relationship with the sliding gear 87 via a spacer 88 is pivotally supported by the rotary shaft 85 such as to be slidable. A plurality of pushing projections 90 having different pitches relative to each other are formed integrally on the peripheral side portion of the changeover operation gear 86 on the side of the sliding gear 87. These pushing projections 90 are each formed substantially in the shape of a herringbone by means of a pushing apex surface 91 and guide slanting surfaces 92 provided on both sides of the pushing apex surface 91. In addition, a substantially triangular engaging projection 93 is formed integrally with the outer side portion of the sliding gear 87 on the side of the changeover operation gear 86. The tip of this engaging projection 93 is adapted to engage consecutively with the pushing apex portions 91, the guide slanting surfaces 92, and sliding surfaces 94 between the pushing projections 90 of the respective pushing projections 90 of the changeover operation gear 86. When the engaging projection 93 is engaged with the pushing apex portion 91 of each of the pushing projections 90, the changeover gear 89 meshes with the first interlinking gear 46. When

the engaging projection 93 is engaged with the sliding surface 94, the changeover gear 89 meshes with the second interlinking gear 47. Furthermore, a coil spring 95 is wound around the rotary shaft 85 between the outer peripheral portion of the changeover gear 89 and the frame member 23, and the sliding gear 87 is constantly urged to approach the changeover operation gear 86 by means of this coil spring 95 via the changeover gear 89 and the spacer 88. The changeover operation gear 86 and the sliding gear 87 both meshing with the drive gear 32 are formed with a mutually different number of teeth.

By providing such an arrangement, when the motor 28 is driven by receiving an external sound signal, as in the case of the preceding embodiment, the drive gear 32 is rotated, and the changeover operation gear 86 and the sliding gear 87 are rotated simultaneously. As the changeover operation gear 86 and the sliding gear 87 rotate, the sliding gear 87 is gradually separated from the changeover operation gear 86 in opposition to the coil spring 95 owing to the mutual difference in the number of teeth. The tip portion of the engaging projection 93 runs up on the pushing apex portion 91 of the pushing projection 90 and is pushed by the same. At the same time, the changeover

IN BOTH EMBODYMENTS THE GEAR CHANGEOVER MECHANISM AND THE AUTOMATIC GEAR CHANGEOVER MECHANISM ARE OPERATIVELY CONNECTED, AS SHOWN IN FIGS 5 AND 9, BETWEEN THE MOTOR OUTPUT SHAFT 29 AND THE FIRST, SECOND AND THIRD CRANKSHAFTS, 45, 50 AND 65, TO EITHER ROTATE ONE OF THE FIRST, SECOND OR THIRD CRANKSHAFTS, I.E. 65, BUT NOT THE OTHER TWO OF THE CRANKSHAFTS, I.E. 45, 50, OR TO ROTATE THE OTHER TWO CRANKSHAFTS (E. 45, 50, BUT NOT THE ONE CRANKSHAFT I.E. 65.

the second interlinking gear 47.

The rotation of this second interlinking gear 47 rotates the third crankshaft 65 via the second relay gear 52 and the leg driving gear 66, and the leg frames 4, 4 are moved alternately back and forth, as in the case of the preceding embodiment.

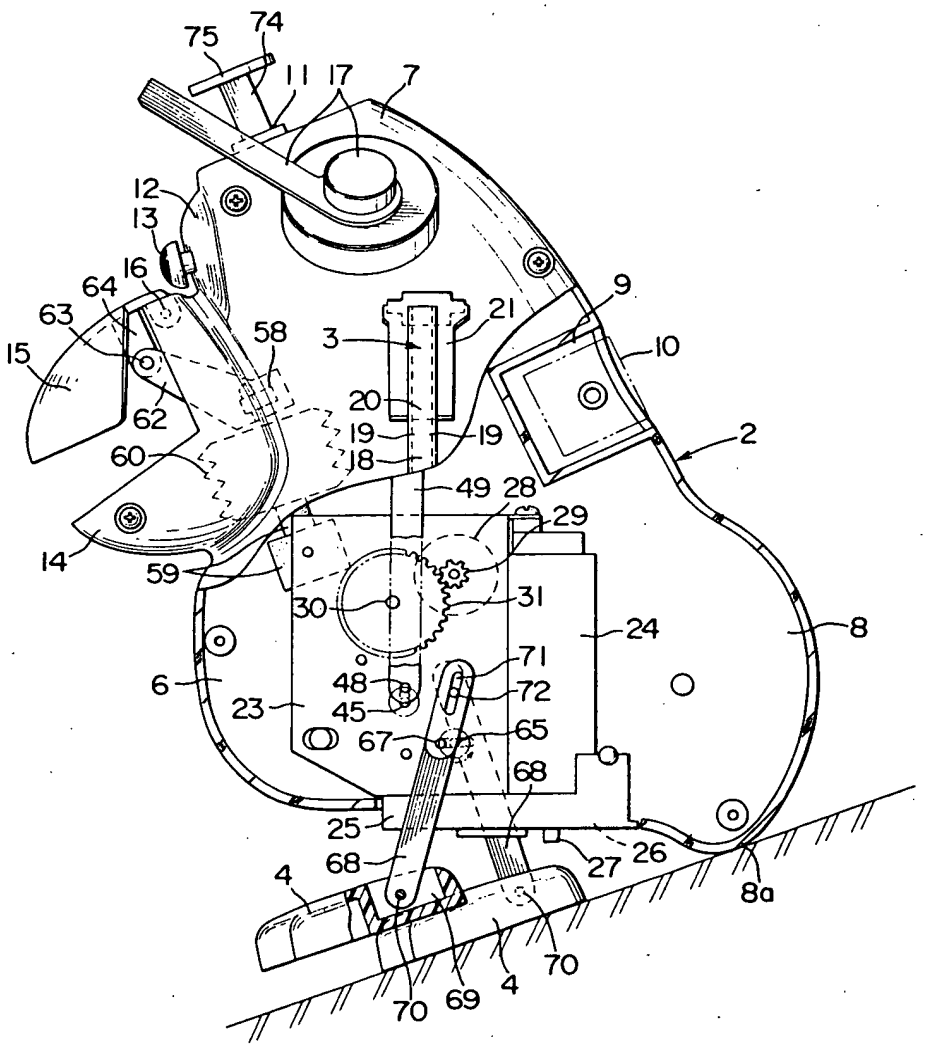
Thus, the rotation of the drive gear 32 in one direction rotates the changeover operation gear 86 and the sliding gear 87. As they rotate continuously, the engagement of the changeover gear 89 is automatically changed over alternately relative to the first interlinking gear 46 and the second interlinking gear 47 by means of the approaching and separating movements of the sliding gear 87 with respect to the changeover operation gear 86. The interlinked engagement of these changeover operations allows the toy body 1 to exhibit the same motion as that of the preceding embodiment.

~~(Effects of the Invention)~~

In accordance with one aspect of the present invention, when the toy body receives an external sound signal, the arm frames on both sides, the mouth portion, and the sounding member are operated, so that the toy body makes a sound while operating its both arms and opening and closing the mouth.

interest by preventing the tendency to readily lose interest in the motion by virtue of its ~~unexpected-ness~~ UNEXPECTED MOVEMENTS.

FIG. 3


75
74
11
17
7
12
13
16
64
63
15
58
3
21
9
10
20
19
19
18
2
60
62
49
28
29
14
59
30
31
24
8
71
6
48
72
23
45
65
67
68
25
68
27
26
4
8a
70
69
4
70